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# OSTEOID OSTEOMA

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The name "Osteoid Osteoma" was coined by Henry L. Jaffe, Director of Laboratories, Hospital for Joint Diseases, New York City, in his article published in 1935[5]. He described five cases of "benign neoplasm of bone apparently not hitherto classified." In 1940 he and Louis Lichenstein published a second article[6], at which time a total of 33 cases had been collected. His last article appeared in Radiology in 1945[7] and by then he had accumulated the experience of 62 cases. A comprehensive review of the literature published by Mary Sherman in *The Journal of Bone and Joint Surgery* in 1947[10] reported 128 cases in the literature plus 30 of her own, making a total of 158 proven cases of osteoid osteoma. To this we have added eleven of our own cases. From these facts you can see that this fairly recently recognized lesion is not common.

Jaffe states that the x-ray is the most important single aid in making the diagnosis of osteoid osteoma. Before discussing the radiology of this lesion we should consider its history, incidence, etiology, clinical picture and pathology.

On reviewing articles printed before Jaffe's first paper in 1935 one can pick out cases that were probably "Osteoid Osteoma" which were classified as "Sclerosing non-suppurative osteomyelitis of Garré," — "Osteomyelitis with annular sequestrum" and "Solitary bone abscess." Bergstrand[1] described 2 cases in 1930 — one in a metatarsal and one in a phalanx. He felt that they were neither inflammatory nor neoplastic and attributed them to embryonal rests. His description and illustrations leave no doubt that the lesions were osteoid osteoma. In 1934 Milch[8] reported three cases which he called benign osteoblastic tumors. These three cases were included in Jaffe's first paper as Osteoid Osteoma.

## Incidence

The sex incidence of the disease favours males in about the proportion of two to one. The age incidence shows that Osteoid Osteoma has a predilection for adolescents and young adults. The accompanying table I shows the record of the accumulated cases in the literature plus 11 of our own. As you can see the great majority of the cases are between 11 and 25.

**TABLE I**

**Age Incidence of Osteoid Osteoma**

| Age in Years | No. of Cases |
|---|---|
| 1 - 5 | 9 |
| 6 - 10 | 18 |
| 11 - 15 | 39 |
| 16 - 20 | 45 |
| 21 - 25 | 28 |
| 26 - 30 | 17 |
| 31 - 35 | 6 |
| Over 35 | 4 |
| TOTAL | 166 |

The sites of these lesions are shown in Table II. The bones of the lower extremity are more commonly affected than the upper. The lesion has not been found in the scapula, clavicle or skull as yet.

**TABLE II**

**Location of Lesions of Osteoid Osteoma**

| Bone | No. of Cases |
|---|---|
| Tibia | 37 |
| Femur | 34 |
| Vertebrae | 18 |
| Astragalus | 14 |
| Fingers (Including Metacarpals) | 12 |
| Toes (Including Metatarsals) | 10 |
| Humerus | 10 |
| Fibula | 7 |
| Radius | 6 |
| Os Calcis | 5 |
| Ulna | 3 |
| Patella | 1 |
| Pubis | 1 |
| Tarsal Navicular | 1 |
| Hamate | 1 |
| Capitate | 1 |
| Ankle (bone unspecified) | 1 |
| Ribs | 1 |
| TOTAL | 163 |

### Clinical Picture

The most striking clinical feature is the fact that almost invariably the patient seeks medical aid for the relief of pain. Usually the pain is first vague and intermittent. It later becomes more severe, more steady and is localized to one small area. A large percentage state that the pain is worse at night and will awaken them from sleep. It is surprising that many will volunteer the information that aspirin relieves the pain. Usually physical exercise does not increase this pain. A case was reported by Cohen & Brown[1] where the pain was referred from an osteoid osteoma at the lower end of the radial shaft to the medial surface of the right elbow. Pressure on the lesion could produce the pain and surgical removal of the lesion cured the pain. This is the only case we could find where there was referred pain. The duration of symptoms range from a few months to 5 years. Histories of less than 6 months are rare and over 2 years are rare.

On physical examination there is tenderness to pressure which is usually very definitely localized to the lesion. Often there is definite bony thickening also. There is very rarely any heat, and never redness of the skin over the lesion. Systemically there is no fever or leucocytosis. Usually there is no elevation of sedimentation rate although one of our cases had an increase in the sedimentation rate.

### Pathology

An osteoid osteoma is a single, small oval or roundish lesion never becoming more than about 6 cms., and usually 1 or 2 cms. in diameter; however, it incites considerable reaction about it which may reach much larger proportions. The nidus is always composed of the same few components but these vary from case to case in the pattern in which these structures are arranged. There is always a background of vascular fibrous stroma containing multinucleated giant cells and osteoid tissue which is irregularly calcified. The initial step in the evolution of this slow growing benign tumour is the proliferation of the local bone forming mesenchyme particularly osteoblasts. In early cases the tumour consists of a vascular mesenchymal substratum packed with osteoblasts and a few osteoclasts.

Further along the line intercellular substance develops between the osteoblasts. This substance calcifies very slowly so that at this stage the tumor contains large amounts of osteoid or numerous osteoid trabeculae. Subsequently, the osteoid becomes calcified and converted into atypical bone. Still later the lesion is composed of compacted trabeculae of this abnormal bone. The intertrabecular tissue is vascular and may be quite cellular in some places. In this latter stage the osteoma phase is most conspicuous microscopically, whereas in the intermediate stage the osteoid phase is most noticeable.

The response of the surrounding tissues is also of great importance. When the osteoid osteoma develops in spongy bone it is surrounded by a narrow zone of vascular connective tissue. Surrounding this again is an area of sclerotic bony tissue with thick irregular trabeculae interspersed with fibrous marrow. In compact bone such as the cortex the perifocal response is much more pronounced. The cortex is thickened over a large area and is usually composed of two layers. The first layer is of more or less transformed original cortex and outside of this is a layer of compact newly formed periosteal bone. The osteoid osteoma may be found in the inner side of the transformed original cortex, between the two layers or entirely within the new cortex. Microscopic examination has never revealed any evidence of inflammatory changes which would account for this perifocal sclerosis.

### Etiology

It is generally agreed now that this lesion is not of an inflammatory nature and that it is a distinct entity as Jaffe maintains. However, many do not agree that it is a benign neoplasm. Brown & Ghormly[3] and Brailsford[2] are exponents of the theory that osteoid osteoma is due to infection, but their arguments are not sound in our opinion. The time allotted to this paper does not allow us to go into the "pros and cons" of either the inflammatory or the neoplastic origin of Osteoid Osteoma.

### Radiological Picture

The radiological picture ties in with the pathological picture and can be divided into early, intermediate and late stages in the same manner. In the early stages the lesion may not show radiologically, which makes it advisable to repeat negative X-rays if the clinical history is suggestive of osteoid osteoma.

In the so-called initial stage the lesion may be radio-opaque with no radiolucent ring around it, especially if no perifocal reaction has occurred.

In the intermediate stage, we have the usual picture of a circular or oval radiolucent lesion which may or may not contain a central radio-opaque area depending upon the amount of calcification of the osteoid tissue. If this lesion is in or abutting on the cortex and the perifocal reaction is dense, overpenetrated films or laminograms may be necessary to demonstrate the nidus.

In the final stage where the lesion resembles an osteoma the nidus is very dense and is surrounded by a narrow radiolucent area. The perifocal sclerosis of course, varies as it does in all stages.

The radiological differential diagnosis rests between an osteoid osteoma and a localized bone infection such as Brodie's abscess when the nidus is radiolucent. When there is considerable sclerosis and the nidus is not seen it could be confused with a sclerosing osteomyelitis or even a fibrosarcoma. If the lesion is just under the articular surface of a bone and the nidus shows some calcification it could be confused with an osteochondritis dessicans. On the other hand, an enostosis may be diagnosed as an osteoid osteoma.

The following cases should serve to further elucidate the subject.

**Case 1.**

Mr. W. A. A white male aged 29 years gives a history of pain in the wrist for two months. It was intermittent in nature and came on both day and night. It was not aggravated by exercise and did not follow trauma. His family doctor had an X-ray taken which showed a fusiform enlargement of the lower radius mostly anteriorly with a radiolucent nidus. A diagnosis of an inflammatory lesion was made and the patient was referred to Dr. David Bohnen to whom we are indebted for this case. The patient was tender over this area but there was no definite swelling, redness or local heat. Temperature, sedimentation rate and W.B.C. were normal. The lesion was removed surgically. The nidus was encountered at operation and was lifted out. The wound healed by primary intention and pain was immediately relieved and has not recurred. The pathological report was osteoid osteoma.

Fig. 1, shows case 1. The lesion is well visualized at the juncture of the lower and middle thirds of the radius. The nidus is best seen in the lateral view.

**Case 2.**

Mrs. D.W. A white female aged 45. This was the oldest case in our series. Her first complaint was of puffiness on the dorsum of the left foot, six months before consulting Dr. R. I. Harris to whom we are indebted for many of these cases. Later she noticed discomfort which was worse at night. Walking or exercise did not bother her. She gave no definite history of trauma. An X-ray showed a fusiform thickening of the shaft of the left 2nd metatarsal with no evidence of a nidus. A second examination with more penetration revealed the nidus in the mid-shaft and osteoid osteoma was diagnosed. During the next three months the pain increased and was relieved by aspirin and codeine.

The lesion was removed and proved to be an osteoid osteoma pathologically. The wound did not heal by primary intention but this is the only one in our series that did not. However, it did heal later and the operation relieved the pain.

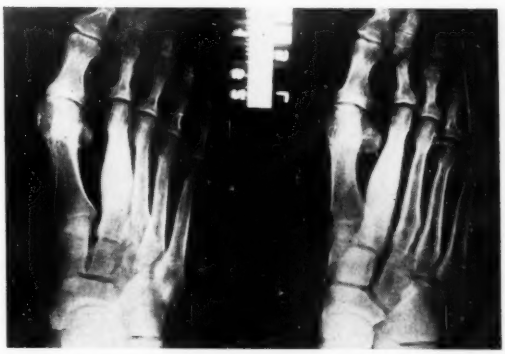

Fig. 2, shows case 2. The lesion can be seen in the shaft of the 2nd metatarsal showing marked thickening of the surrounding cortex.

**Case 3.**

Mrs. L. S. A white female aged 20 years gives a history of straining her ankle 8 months before consulting Dr. R. I. Harris. The ankle was not discoloured but from that time on she had trouble with her ankle. At the time of her visit she could not sleep at night because of the pain. There was some slight swelling and she complained of "going over" on her ankle frequently. X-rays taken previously were negative. Dr. Harris had X-rays made to show luxation of the ankle. They were negative for this but showed a lesion in the anterior portion of the os calcis which was not diagnosed. Sedimentation rates were normal. She was followed for six months and further sets of X-rays were taken. In the last set, the lesion had developed a visible

radiolucent nidus in the sclerotic portion of the os calcis and a diagnosis of osteoid osteoma was easily made.

It was removed. The wound healed and she is relieved of her pain. There is however some limitation of movement of the mid-tarsal joint.

**Case 4.**

Mr. R. W. A white male aged 22 years. Four years before admission to hospital the patient awakened one morning to find a painful, tender lump over the medial side of the lower end of the left thigh. The pain was dull and aching in type. It was not disabling and was not affected by walking. It varied slightly over the next few years and at one time it became severe following bowling. Otherwise the patient was in good health.

An X-ray revealed a fusiform enlargement of the anterior medial aspect of the left lower femoral shaft, composed of dense structureless bone. A definite oval radiolucent nidus was seen, and a diagnosis of osteoid osteoma was made. Dr. R. I. Harris removed a block of bone from the femur and the block was x-rayed following operation. The nidus was clearly seen in this film. The lesion healed by primary intent and his pain was relieved.

**Case 5.**

Mr. J. M. A male aged 20 years. 18 months prior to admission the patient injured his left middle finger. Following this the proximal interphalangeal joint became swollen. It was tender on full flexion and deep pressure but did not pain otherwise. An x-ray showed a fusiform widening of the shaft of the proximal phalanx of the left middle finger with a radiolucent area on the anterior surface just proximal to the head. This was diagnosed osteoid osteoma. The patient was operated upon by Dr. E. B. Tovee to whom we are indebted for this case. The lesion was found on the palmar aspect of the proximal phalanx just proximal to the joint. The nidus measured about ½ cm. in diameter. The pathological diagnosis was osteoid osteoma. The wound healed by primary intention and the patient was relieved of his symptoms.

**Case 6.**

Miss S. T. A female aged 16 years. Six months prior to consulting Dr. R. I. Harris, she began to experience soreness down the left leg to the calf. There was no history of injury. The pain at first was intermittent but later became more steady coming on daily. Her sedimentation rate was elevated and there was limitation of movement of the left hip.

Three months after her first visit the pain became nocturnal in character and she had to get up twice during the night to take aspirin which gave her relief. At this time an x-ray showed a radiolucent area on the medial aspect of the head of the femur at the articular surface with an area of bony tissue which appeared to be separate from it and lying in the soft tissues. There was no area of sclerosis around this lesion. It was thought radiologically to be an osteochondritis dessicans or possibly an osteoid osteoma.

The lesion was removed surgically, a block of tissue being taken around it. The patient healed well and her symptoms were relieved. Pathologically, it was a typical osteoid osteoma, which was becoming ossified, accounting for the bony fragment which was seen.

**Case 7.**

Mr. J. O. A male aged 14 years. The patient developed an aching persistent pain in the left ankle 15 months before admission. There was no history of injury but the pain came on first while he was playing hockey. The pain was made worse by exercise and improved on rest. On occasions the pain occurred as a dull throb at night keeping the patient awake.

On examination, there was slight swelling at the lower part of the anterior surface of the left ankle joint. X-ray at this time showed a radiolucent pocket on the dorsum of the neck of the talus with a sclerosed area around it. The diagnosis of osteoid osteoma was made. The patient was operated upon by Dr. F. B. Dewar, to whom we are indebted for this case. At operation a small, round, red, soft area measuring ¾ cm. in diameter was noted on the upper surface of the neck of the talus. A block of tissue was removed. The patient healed well and the symptoms were relieved. Pathological diagnosis was osteoid osteoma.

**Case 8.**

Miss C. A. A white female aged 21 years. Two years before operation the patient complained of discomfort over the radial side of her left wrist in the region of the radial styloid. She also noticed some swelling there. Both the pain and swelling persisted and gradually became worse. She underwent various forms of treatment such as tonsillectomy, and immobilization in a cast, to no

avail. Finally she had her chest x-rayed and at the same time a film was made of her wrist which showed a lesion in the styloid process of her radius which consisted of a dense central area with a radiolucent area around it and sclerosis in the surrounding bone. There was extreme tenderness on pressing over the radial styloid. A combined surgical and radiological diagnosis of enchondroma, giant cell tumour or chronic osteomyelitis was made. The patient was operated upon by Dr. R. I. Harris. There was a dark coloured spot on the styloid which was removed. The pathological diagnosis was osteoid osteoma. The lesion healed well but the patient continued to complain bitterly of pain in her arm. The pain however, was not localized to the site of the lesion and it was found that she had psychological difficulties. When these were straightened out the pain cleared and she has no recurrence to date of the pain in the lower end of her radius.

**Case 9.**

Miss V. B. A white female aged 32 years. Over a period of months the patient noticed an increase in the size of the middle phalanx of her right middle finger without pain. Several weeks before admission to hospital she had periods of spasmodic pain in this region. There was no redness or heat or other signs of inflammation. The X-ray picture showed a lesion involving the lateral half of the distal end of the middle phalanx involving the articular surface. There was a central portion of dense mottled calcification surrounded by a narrow radiolucent area with dense sclerosis of bone around this. At that time it was thought that the patient had tuberculous dactylitis, but there was no systemic evidence of tuberculosis. The lesion was removed surgically. There was no recurrence and healing was satisfactory. The pathological diagnosis was osteoid osteoma.

**Case 10.**

Miss J. N. A white female aged 18 years. Twenty months before the first x-ray was taken this patient noticed pain in the upper left foreleg. The pain was not severe but was worse at night. Later she noticed a hard lump just below and mesial to the knee on the anterior aspect. The pain continued becoming slightly worse especially at night. The swelling did not increase. There was no heat or redness and no systemic evidence of disease. The sedimentation rate was normal. The radiological picture is that of markedly thickened cortex in the antero-mesial aspect of the upper one-third of the tibia. The bone was sclerotic in this area. The medulla was not involved in the lesion. There was a small oval radiolucent area in the centre which had the appearance of a nidus in osteoid osteoma.

An operation was performed. The lesion was removed and proved to be osteoid osteoma, pathologically. The patient made an uneventful recovery.

Fig. 3, shows case 10. The lesion can be seen in the upper end of the femur. The nidus is visualized in the lateral projection.

**Case 11.**

Mr. J. K. A white male aged 18 years. One year before being seen by Dr. R. I. Harris, while playing ball he injured his right index and middle fingers. He recovered within a week. A few months later he noticed his right hand was sore. There was swelling between the 1st and 2nd metacarpals. It ached intermittently being better and worse at times. An x-ray showed an elongated area of thickening along the third metacarpal which had the appearance of an osteoid osteoma. His disability was so slight that operation was not done. He has not been seen for 5 years now, and it is felt that this is probably a case of spontaneous cure of an osteoid osteoma and it is presented as such.

Before closing it would be advisable to mention the treatment. Following the excision of the nidus complete recovery occurs. The hypertrophic perifocal bone need not be removed. However, if the nidus is not totally removed it will recur. Removal invariably cures the symptoms. Healing is almost always by primary intention. Erik Moberg[9] points out that the fact that the lesion is found only in the young would indicate a spontaneous cure. He describes two typical cases clinically and radiologically which showed spontaneous cure. From this one would be led to believe that the disease runs a natural course and cures itself but when surgery gives such dramatic relief of pain it is the treatment of choice. As far as we can gather, irradiation has never been used on an osteoid osteoma.

**Summary:**

The history of Osteoid Osteoma has been discussed and 158 cases have been presented. The incidence, etiology, clinical picture, pathology, radiological findings and differential diagnosis have been mentioned and it is concluded that the lesion is a distinct entity most probably a benign neoplasm and definitely not of inflammatory origin.

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# HOW THE RADIOLOGIST CAN ASSIST IN THE MANAGEMENT OF THE LONG INTESTINAL TUBE

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During the past twelve years the use of the long intestinal intubation tube has become an important adjunct in the treatment of all types of intestinal distention. The mortality from intestinal obstruction has been reduced from approximately fifty percent to twelve percent. This has been due primarily to prompt diagnosis and early surgical treatment. A better understanding of fluid balance, intestinal physiology and blood chemistry and the use of anti-biotics and blood transfusion have also contributed immeasurably. However, suction applied to a decompression tube takes precedence in reducing the death rate.

The radiologist should play as important a role in the management of patients to be intubated as he does in the diagnosis. Having determined the presence of obstruction, and where possible identified the cause, immediate treatment must be advised. Since control of distention is of fundamental importance, decompression by intubation and suction offers the following advantages:

1. Makes surgical procedures simpler.

2. Restores peristalsis and function of the bowel to absorb fluids, salts, etc.

3. Allows preparation for operation, thereby converting an emergency into an elective procedure.

4. In paralytic ileus, it is the principal therapeutic agent.

5. May be used preparatory to bowel resection to protect the suture lines from post operative distention.

Intubation with a long tube is potentially dangerous under certain conditions. Its contra-indications, as follows, must always be recognized:

1. Suspected strangulations: gangrene or perforation may occur if surgery is delayed.

2. In obstruction due to external hernias.

3. In large bowel obstruction decompression is of limited value.

Intestinal intubation requires the "know-how" and unless all the details are carried out carefully and completely, the tube is better left in the supply room. Learn how to use it correctly or leave it strictly alone.

The technique of insertion of the long intestinal tube is not difficult, but to quote Ross Golden[1] "requires patience, care and experience." Because the roentgen examination plays an important part in the management of these cases, in most hospitals, as in ours, a radiologist directs the procedure. Unless there is one individual sufficiently interested to supervise the tube from its insertion to withdrawal and instruct the bedside nurse in the many details, the entire performance frequently becomes worthless. All too often the attending surgeon delegates the intubation to a junior intern, unfamiliar with the construction or use of the tube.

For a period of almost fifteen years, we have used the Miller-Abbott tube. Since 1944, following the reported experience of Harris[2], we have added mercury to the balloon. This tube has been the most successful in our hands in spite of the disadvantage of the small lumen for suction. The other long intestinal tubes in use today, Harris[2], Johnston[3], Cantor[4], have their advocates and each has advantages, but the type of tube is secondary to a carefully planned and executed procedure.

The technique of intubation varies to some degree with the different type tubes and with different operators. Our own technique has been modified many times over a period of years and as far as we know embraces nothing original.

## PROCEDURE:

A tray is prepared containing the following: Miller-Abbott tube; 50 cc. syringe; ½" adhesive tape; surgical lubricant; mercury; kidney basin; drinking cup; several small towels.

The Miller-Abbott tube must be tested for patency of both lumina and the balloon inflated under water to insure that it does not leak. The distal several inches of the tube

are lubricated and with the patient semi-recumbent, it is introduced into the larger of the two nasal passages. (We do not use a local anaesthetic). Swallowing of the tube is assisted by sips of water. When the tube reaches the 60 cm. mark, aspiration may indicate its position in the stomach. When in the stomach, the balloon is inflated with 30-40 cc. of air and withdrawn to the oesophageal orifice identified by gentle tugging.

We now allow 10 - 12 inches of slack above the entrance to the nostril and tape the tube to the forehead with adhesive. The bulb is now deflated and 2 cc. of mercury introduced. The patient is placed on the right side and several inches of tube swallowed, assisted by sips of water. Usually in a very short time all the measured slack disappears, indicating that the tube is probably in the antrum, or in the duodenum. At this point, careful inflation of the balloon may determine by the resistance to the plunger whether it is in the stomach or duodenum. Aspiration and testing of the fluid for acidity may be helpful. Additional premeasured slack is adjusted to forehead and its disappearance is an indication of progress. At this point it may be necessary to determine the position of the tube by a bedside film or by removing the patient to the radiographic room. Alternatively, the above procedure may be performed under fluoroscopic control. One need hardly mention that fluoroscopy should always be used with caution to avoid over exposure to the patient. When the tube enters the duodenum, 20-30 cc. of air is injected into the balloon and the opening clamped, taped and marked to avoid the accidental introduction of fluids. The progress of the tube may become quite rapid and additional slack must continually be provided. The suction may be attached when the tube is in the stomach or deferred until in the duodenum. This will depend largely on how rapidly the tube enters the small bowel. The tube on its way, care must be directed to maintaining proper suction and sufficient slack. Frequent lavage with a syringe may be necessary to ensure patency of the suction tube.

The continued advance of the tube and clinical signs of decompression indicate successful intubation, but the progress of decompression can best be observed by roentgen methods. Distention sometimes reappears above the suction, particularly in paralytic ileus. In such cases the tube is withdrawn into the upper jejunum and decompression of the proximal loops begins again. This may have to be repeated more than once. Clamping the tube for periods as a method of assessing the decompression, can be misleading. A partial obstruction may still be present with no clinical evidence but readily detected on films. The decision as to when the tube should be removed can best be determined by consultation between surgeon and radiologist. Premature removal may result in a return of the distention. The use of a thin barium mixture introduced into the gut through the tube to determine if the continuity of the bowel is restored, is a simple, safe and accurate procedure. This radiological technique described by Cantor[5] has been extremely helpful to us in difficult cases.

The complications of intestinal intubation have been discussed by many observers, [1,3,4,6] and need not be repeated here. We encountered one case where the Miller-Abbott tube impacted in the mid small bowel due to a defect which developed between the lumina. The balloon, distended with fluid, could not be aspirated or withdrawn and surgical removal became necessary.

Failures were many during our early experiences, but decreased as acquaintance with the tube increased. The use of mercury in the balloon cut down the percentage of failures considerably. We now undertake intubation with confidence and our unsuccessful attempts are probably less than five percent.

In one hundred and eighty cases of intestinal obstruction in the Winnipeg General Hospital, intubation with a Miller-Abbott tube was used successfully in fifty-two cases, the criterion for success being the introduction of the tube into the small bowel with partial or complete decompression.

In twenty-seven cases, the tube was used for pre-operative decompression in mechanical obstruction. In twenty-five cases, it was used without surgery; nine were paralytic ileus, fourteen mechanical obstruction and two were cases of obstruction due to carcinomatosis.

The decompression of the bowel in these cases was a significant factor in their management but treatment of only one phase, namely distention. The best interests of the patient demand the closest co-operation between the internist, surgeon and radiologist whereby all resources are utilized to the maximum.

## CONCLUSIONS:

With the increasing use of the long intestinal intubation tube, it is evident that the radiologist plays an important role in directing the successful intubation and furnishing

information as to the progress of the decompression. The determination of the optimum period to remove the tube can be ascertained most accurately by roentgen methods.

The radiologist shares with the internist and surgeon, the responsibility of the successful management of cases of intestinal distention.

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# BENIGN INTRAMURAL EXTRAMUCOSAL TUMORS OF THE OESOPHAGUS

## A Report of two Cases

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Neoplasms which involve the mucosal lining of the oesophagus are comparatively common, and less commonly mediastinal lesions involve this organ by pressure or extension. Tumors which originate in the oesophageal wall without involving the mucosa are quite rare. In reviewing the literature, only 44 cases of benign intramural extramucosal tumors have been reported which have been explored surgically.

Benign tumors may arise from any type of cell in the oesophageal wall and cysts may develop from bronchial or oesophageal cell rests. The great majority of tumors are leiomyomas, with cysts of oesophageal or bronchial origin being the second most common.

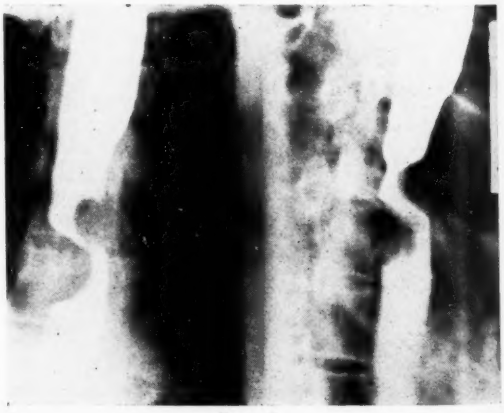
It is the purpose of this paper to present two additional cases which have been verified surgically, and to comment briefly on radiological diagnosis.

**Case 1.**

H. A. O. This man, age 34, had intermittent dysphagia for 2 years before consulting Dr. G. P. Fahrni in July 1947. Symptoms were usually shortlived after ingesting solid food, with periods of freedom from complaints for periods up to several weeks. Dull pain was occasionally felt retrosternally. Physical examination was essentially negative. Radiological examination at that time showed a lobulated filling defect in the oesophagus just below the aortic arch level causing minor partial obstruction to the passage of thick barium. No destruction of mucosa could be demonstrated. No alteration in the mediastinal shadows was demonstrated in P.A and lateral chest films. Oesophagoscopy was done ten days later, at which time a filling defect was seen which was covered with intact mucosa. A biopsy was done with a histological report of normal oesophageal mucosa. Following oesophagoscopy, complaints were relieved for over a month but recurred. Radiological examinations were repeated in December 1947, April 1948 and October 1948 with the same findings except that a slight increase in the degree of minor obstruction was suggested.

In November 1948 at the Mayo clinic, a left thoracotomy was performed by Dr. O. Claggett, and three separate, firm, rounded, marble-sized tumors were found within the oesophageal wall. Two were in the left lateral wall and the third was anterior and slightly above the others. These enucleated readily and were found to be in the muscular layer extending into the sub-mucosa. The oesophagus was closed and the mucosa was left intact. Histopathological classification of the excised tumors was "Leiomyoma". Convalescence was uneventful and recovery complete.

Case 1



Case 1

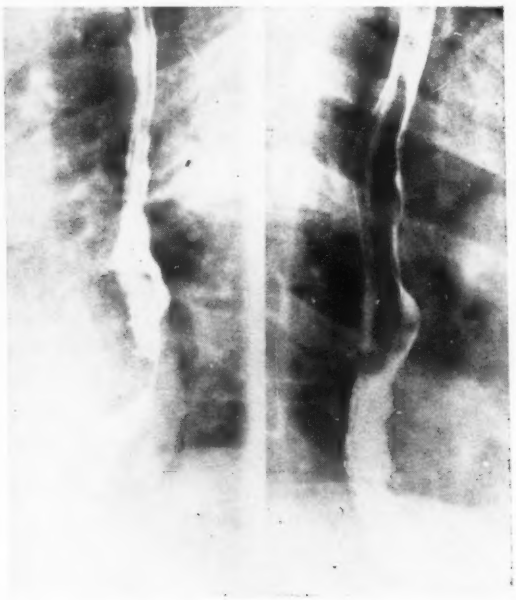
Case 2.

N. L.: This man, age 40, had intermittent progressive difficulty in swallowing solid food for one year before consulting Dr. F. A. B. Sheppard on April 26, 1951. Fluids never produced complaints but solids seemed to stick at the lower end of the guliet with retro-xiphoid pain. Drinking fluid would usually relieve these symptoms. Physical examination revealed no abnormality. A radiological examination was done and the only abnormality recognized in the upper gastro-intestinal tract was a persistent area of localized spasm just above the lower end of the oesophagus. Peristaltic waves became very vigorous and disorderly as they approached this level. No organic changes were shown and the mucosa was considered to be intact. It was thought that the changes could have been due to a localized oesophagitis or possibly an unrecognized oesophageal ulcer. Oesophagoscopy was done on the following day but no abnormality was seen.

Case 2

Symptoms persisted and became worse with burning pain beneath the lower end of the sternum, and he was re-examined on August 2nd when an intramural extramucosal tumor was suggested on spot-film evidence, though numerous spot films did not demonstrate this abnormality. A third examination on August 20th was done and at this time the tumor was demonstrated definitely in numerous spot films. The endoscopic examination was repeated on August 27th, and slight bulging of the lower oesophageal wall from the right side was recognized. The mucosa in this region was completely normal in appearance. A left thoracotomy was done by Dr. F. A. B. Sheppard on November 13th and a large fatty tumor was found occupying the right and anterior aspect of the lower oesophageal wall, compressing and distorting it. This mass measured 5 x 3 cms. being oval in shape with its long axis in the line of the oesophagus. The tumor was excised without opening the mucosa. Convalescence was uneventful and the dysphagia has disappeared from the time of discharge from the hospital. Histopathological diagnosis was "tumor of fatty and fibrous tissue — lipoma".

The roentgenological diagnostic features, difficulties, and the differential diagnosis of these tumors have been extremely well described in the American literature by Shatski and Hawes in 1942[1], and in the British literature by Harper and Tiscenco in 1945[2]. The



Case 2

cases which are reported above show the sharp step-like angle between normal oesophagus and the filling defect of the tumor. The "smear" or "mould" appearance produced by the smooth mucosa stretched over the tumor is also shown and is described as another characteristic alteration. The ease with which these tumors can escape detection fluoroscopically and in conventional films was most apparent in the second case where repeated

examinations were required before a diagnosis could be definitely made. When a large bolus of barium is employed the tumors may be covered completely. Once the oesophagus becomes nearly empty the lesion becomes invisible. If too small a quantity of barium is used the defect does not appear in contrast and the usual accompanying aerophagia completely defeats recognition. Fluoroscopy and spot films in profile are most important although face-on films must be obtained to demonstrate the integrity of the overlying mucosa. In both of the patients reported here, there was a disturbance of the normal neuromuscular function with a transient overfilling above the lesion. In the second case the prominent feature was a localized spasm with very vigorous and disorderly peristaltic waves immediately above and in the affected segment.

Oesophagoscopy is valuable and should be done in every case to exclude infiltration or other involvement of the mucosa. Attempts to obtain a biopsy during this examination are unwise and may jeopardize easy enucleation by introducing infection into the tumor bed. In general, it is difficult to obtain tumor tissue from these lesions as they are usually firm and hard, particularly the leiomyomas and fibromas.

The lipoma reported in this short series is believed to be unique as it is the only reported case of its kind. Lipomas have been encountered previously only in autopsy material as an incidental finding.

### REFERENCES

1. Schatzki, R. and Hawes, L. E. Extramucosal tumors of the oesophagus. Am. J. Roentgenol. & Rad. Therapy, 1942, 48, 1-15.
2. Harper R. A. K. and Tiscenco E. Benign tumor of oesophagus and its differential diagnosis. Brit. J. Rad. 18, 99-107, 1945.

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## POSITIONS AVAILABLE

First Assistant Radiologist required for the Toronto East General and Orthopaedic Hospital. Diagnostic work primarily. Position available 1st of January 1953. Applicants should apply to: Dr. A. R. McGee at the above hospital in Toronto, or to the Central Office of the Association.

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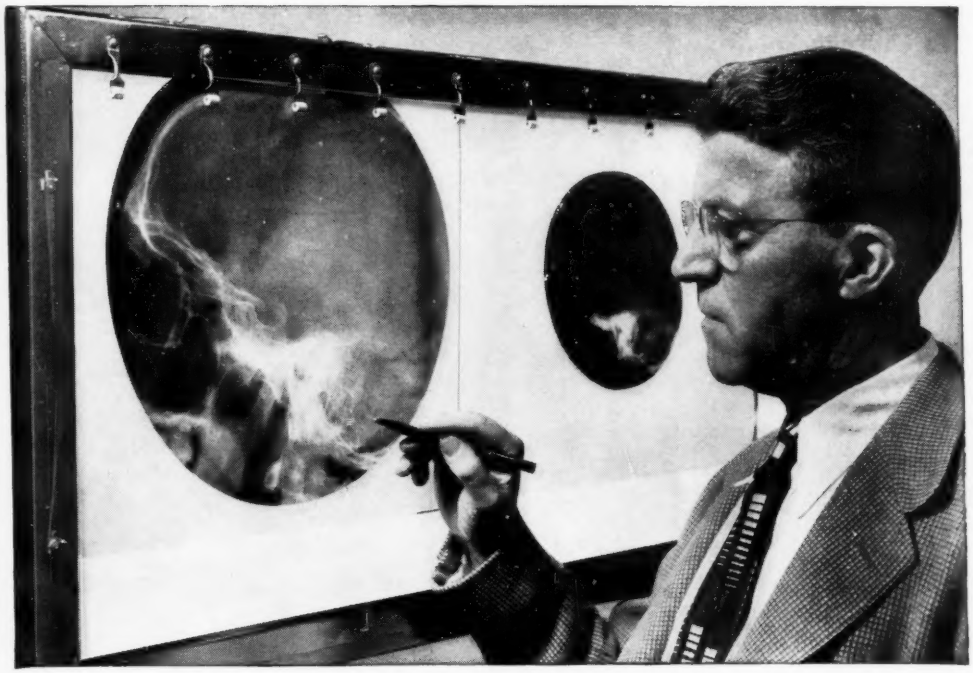
Radiologist trained in diagnostic and therapeutic radiology required by the Royal Columbian Hospital, New Westminster, B. C. Applicants should write to the Central Office of the Association.



# SWELL HEAD

Swell Head, and we're justly proud of it. Unlike the magnified head shown in front of the illuminator above—ours is the swell head associated with pride. Notwithstanding innumerable contributions to the mechanics of X-ray, Philips now introduces another signal achievement to a long list of X-ray tube design improvements with a 0.3 mm. focus rotating anode tube.

With this point source, any immobilized part of the anatomy can be greatly enlarged with unexcelled detail. In the above case, the pineal area was enlarged three times to illustrate more clearly the extent and the nature of pineal calcification.

In normal radiography the detail rendered by this fractional focus is incomparable. No existing tube can be substituted for enlargement work. The focus may be loaded to 500 MAS at 100 KVP. It is available only as a double focus tube with its companion focus either 1.0 mm. or 2.0 mm.

# LIVRES NOUVEAUX

**The Normal Cerebral Angiogram** by Arthur Ecker, M.D. Ph.D. (Charles C. Thomas - Publisher - Springfield Illinois 1951).

Cet ouvrage est divisé en deux parties essentielles: la technique de l'angiographie et l'anatomie radiologique.

L'auteur semble avoir voulu présenter sur l'angiographie ce que Dyke et Davidoff ont fait pour l'encéphalographie normale. Nous attendrons donc maintenant, la parution de "The abnormal cerebral angiogram". Ecker ne me paraît pas cependant aussi bien documenté qu'il le faudrait ou que Dyke ou Davidoff l'étaient. En effet, si l'on jette un coup d'oeil sur la bibliographie, l'on remarque que Lindgren et Bull, pour ne citer que deux autorités reconnues, n'ont pas été consultés. Il aurait pourtant été utile à l'auteur de connaître la technique minutieuse et logique de Lindgren.

Evidemment, les meilleurs résultats sont obtenus avec la technique à laquelle l'on est habitué. Il est étonnant qu'Ecker ait pu atteindre le chiffre imposant de 765 artériographies sans songer à se faire fabriquer un appareil "changeur de cassettes" plutôt que de procéder manuellement à un changement laborieux, à cause d'un tiroir incommode et difficile de manipulation.

Evidemment, l'on parvient après entraînement à réussir de beaux clichés, mais quelle amélioration dans les images, et dans les possibilités de diagnostic lorsqu'un appareil fait une partie de l'ouvrage, et surtout, lorsque le nombre de clichés pris lors d'une injection peut être doublé. Il me semble donc que la technique préconisée ici, devrait n'être pas généralisée, parce qu'inadéquate.

La substance de contraste recommandée par l'auteur est le Diodrast à 35%. Avec raison il déconseille le Thorotrast. Il recommande en plus de réchauffer le colorant avant de l'injecter pour diminuer la possibilité du spasme artériel.

Le spasme artériel est certainement moins à craindre lorsque la substance de contraste a été réchauffée, mais alors la perméation du produit est plus grande et le spasme artériel serait alors une réaction de défense qu'il ne faudrait pas contrecarrer.

Un spasme tenace est tout aussi à craindre que la perméation du Diodrast.

La technique de ponction de l'artère est très bien décrite tant pour la carotide que pour la vertébrale. Cette description va jusque dans les fins détails et devrait sûrement aider les commençants.

L'auteur emploie des incidences variées. La multiplication des incidences est à mon avis une très bonne chose et peut remplacer avec avantage la stéréoradiographie bien que Ecker continue de l'employer.

L'anatomie angiographique est bien traitée avec une abondance de films. Presque tous les clichés sont d'excellente qualité et l'on sait comment il est difficile de reproduire convenablement des artériographies. Il semble que la compression de la carotide du côté opposé soit très souvent utilisée pour permettre l'opacification simultanée des réseaux vasculaires droit et gauche.

Cette compression peut être très utile dans certaines circonstances, mais il est à craindre que l'assistant qui la pratique trop souvent reçoive une dose appréciable de rayonnement X.

Le dernier chapitre est consacré au diagnostic angiographique de la hernie du lobe temporal et à celui de la hernie des amygdales cérébelleuses.

Une tumeur sus-tentoriale peut abaisser le tronc cérébral et provoquer une hernie du lobe temporal, alors qu'une tumeur sous-tentoriale peut relever le tronc cérébral.

Cette dislocation pourrait être reconnue par l'abaissement ou l'élévation de l'artère cérébrale postérieure ou à son défaut, de la choroïdienne antérieure qui est anatomiquement parallèle à cette dernière, et se trouve située au voisinage de l'échancrure tentoriale.

Cette observation qui est nouvelle et pour laquelle l'on doit féliciter l'auteur ajoute un autre signe qu'il ne faudra pas manquer de reconnaître.
Malheureusement, ce déplacement vasculaire peut être si minime qu'il nous rendra bien souvent perplexe, et même la variation de la position normale peut devenir une source d'erreur qu'il ne faudra pas négliger.

De toute façon, l'importance dans un tel cas est la localisation exacte de la lésion, ce qui est possible par l'angiographie.

L'abaissement en dehors du trou occipital de l'artère cérébelleuse postéro-inférieure aurait été observé dans un cas de hernie des amygdales cérébelleuses.

Cependant, malgré la possibilité d'un tel diagnostic, l'angiographie ne devrait pas remplacer la ventriculographie dans la localisation des tumeurs de la fosse postérieure.

Jean-Louis Léger, M.D.